EPA Region 7 TMDL Review

TMDL ID:	KS-LA-03-220-2	**Waterbody ID:**	KS-LA-03-W010_7, KS-LA-03-W045_ 2
Waterbody Name:	MEDICINE LODGE RIVER WATERSHED -- SULFATE		
Tributary:	SEE (ENCLOSURE A) FOR TRIBUTARIES COVERED UNDER THIS TMDL		
Pollutant:	SULFATE		
State:	KS	**HUC:**	11060003
BASIN:			
Submittal Date:	6/30/2006		
Approved:	Yes		

Submittal Letter

State submittal letter indicates final TMDL(s) for specific pollutant(s)/water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.

Letter, dated June 30, 2006, and received by EPA on June 30, 2006, formally submitted this TMDL for approval under Section 303(d).

Water Quality Standards Attainment

The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.

Sulfate concentrations at KDHE Stream Chemistry Monitoring Site 220 have ranged from 164 mg/l to 892 mg/l over the period of record, Table 4 and Figure 3. Overall, the average sulfate concentration was 358 mg/l. Concentrations at flows less than median flow averaged 297 mg/l, while those at higher flows averaged 470 mg/l. There are high natural background sulfate concentrations in the Medicine Lodge River. Excursions were seen in all three seasons defined by KDHE (Winter: November-March, Spring: April-July, Summer/Fall: August-October). Seventy-one percent of samples from water quality site 220 were over the criterion of 250 mg/l.

Numeric Target(s)

Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

The ultimate endpoint for this TMDL will be to achieve the Kansas Water Quality Standards fully supporting Drinking Water Use, 250 mg/l, for segments that are naturally able to meet this standard. Thompson Creek is an Exceptional State Water. Domestic Water Supply for Medicine Lodge River, North Branch Medicine Lodge River, Elm Creek, North and South Branch Elm Creek, and Thompson Creek. Special Aquatic Life for Amber, Elm, North and South Branch Elm, Mulberry, Soldier, Thompson, Soldier, the unnamed tributaries and the main stem of the Medicine Lodge River. Primary Contact B Recreation on Elm Creek, Primary Contact C Recreation on Medicine Lodge and Secondary Contact b Recreation on other tributaries.

Numeric Target(s) and Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.

Kansas Implementation Procedures for Surface Water allow for a numerical criterion based on natural background to be established. The specific stream criteria to supplant the existing criteria will be developed concurrent with Stage One of this TMDL following the appropriate Water Quality Standards Process. The limited data for station 589 produce an average sulfate of 375 mg/l for similar conditions seen at station 220 and 588 when the background concentrations were established. However, concurrent sampling and regression analysis, Figure 10, indicates sulfates above station 589 influence those seen at 220, after dilution has occurred from Elm Creek. Therefore, the corresponding endpoint at 589 is anticipated to be the background concentrations at 220 of 450 mg/l to 525 mg/l. Thompson Creek is an exceptional state water, we will maintain the current domestic water supply criteria, 250 mg/l, as the desired endpoint for these segments.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.

There is little irrigation in the watershed. The primary cause of the sulfate impairment of the Medicine Lodge River and Mule Creek in Kiowa, Comanche, and Barber Counties is natural dissolution of gypsum in the bedrock outcropping and underlying alluvial aquifer sediments in the watersheds. Any anthropogenic sulfate sources or hydrologic modifications increasing the sulfate concentration would be minor in comparison with the natural sulfate source in the watersheds. There are three NPDES permitted wastewater dischargers located within the watershed. Sun City Mine, has no recorded discharge during its permit history. City of Medicine Lodge, is not required to collect sulfate data as part of its permit requirements, and has only tested for sulfate once (66.1mg/l, well below the level of concern). Klaver Construction, is located near the confluence of Elm Creek and the Medicine Lodge River. Permit records indicate that this site sporadically discharges 400-500 gallons during infrequent spills from its settling basin, with a load of less than 2.7 pounds of sulfate per day.

Allocation

Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.

The source assessment has ascertained that natural sulfate loading within the watershed generally is responsible for the excursions seen at Kiowa.

WLA Comment

The source assessment has ascertained that natural sulfate loading within the watershed generally is responsible for the excursions seen at Kiowa. An average WLA of 1.9 pounds per day will be established for Klaver Construction. A WLA of 0 pounds per day will be established for New NGC (Sun City Mine).

LA Comment

LA are shown in Table 8 of the TMDL document by station and by flow category.

Margin of Safety

Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.

The margin of safety for the mainstem is reflected in the background concentrations calculations, taken as an average during moderate runoff events, rather than extreme values seen during exceptional high flow events.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).

Seasonal variation has been incorporated in this TMDL through the documentation of the seasonal consistency of elevated sulfate levels.

Public Participation

Submittal describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).

Public meetings to discuss TMDLs in the Lower Arkansas River Basin were held June 7,2006 in Hutchinson. An active Internet Web site was established at http://www.kdheks.gov/W to convey information to the public on the general establishment of TMDLs and specific TMDLs for the Lower Arkansas River Basin. A draft of this TMDL has been maintained on the website since March 1, 2006 and modifications to the original draft have been available to the public for viewing and review up to the date of submitting this TMDL to EPA. A Public Hearing on the original draft of these TMDLs of the Lower Arkansas River Basin was held in Hutchinson on June 7, 2006.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).

KDHE will continue to collect bimonthly samples at Station 220,588,589,590, and 732 including sulfate samples over each of the three defined seasons during the period of 2006-2011. Based on that sampling, the status of 303(d) listing will be evaluated in 2012 including application of numeric criterion based on background concentrations at high flows. Should impaired status remain, the desired endpoints under this TMDL will be refined and direct more intensive sampling will need to be conducted under specified seasonal flow conditions over the period. Background concentrations will be assessed as the average concentration taken during high flow events (those that exceed median flow).

Reasonable assurance

Reasonable assurance only applies when reductions in nonpoint source loading is required to meet the prescribed waste load allocations.

Even zeroing out the WLA would not lead to compliance with the existing water quality standards natural background concentrations of sulfate. This is a phased TMDL following an adaptive management approach. The TMDL has established aggressive WLAs for the permitted facilities and recognizes the need for optional solutions to the problem because of the natural background issue.